NOTES.

UPON the recommendation of the National Academy of Sciences of the United States, the trustees of Columbia College, New York, have awarded the Barnard medal for meritorious service to science, for the five-year period ending with the year 1909, to Prof. Ernest Rutherford, F.R.S., Langworthy professor of physics and director of the physical laboratory in the University of Manchester, for meritorious service to science resulting especially from his investigations of the phenomena of radio-active materials. The medal is "of gold, nine-tenths fine, of the bullion value of not less than two hundred dollars." Previous awards of the medal are:—1895, Lord Rayleigh and Sir William Ramsay; 1900, Prof. W. C. von Röntgen; 1905, M. Henri Becquerel.

THE death is announced of Prof. Louis Raffy, who for twenty-six years was on the staff of the University of Paris. Since 1904 Prof. Raffy occupied the chair of analysis and geometry. At the funeral, orations were delivered by Prof. Paul Appell, dean of the faculty of sciences in the University of Paris, and by Prof. Bricard, president of the Paris Mathematical Society.

AN International Hygiene Exhibition is to be held at Dresden from May to October, 1911. The exhibition will include five sections: the scientific, the historical, the popular, sports, and industry. The scientific section will aim to present as completely as possible a picture of the science of hygiene. The general secretary for the scientific department is Dr. Weber, member of the Imperial Board of Health, Berlin.

WE regret to announce the death, at College Place, Camden Town, on June 19, in his one hundredth year, of Mr. E. Gerrard, formerly on the staff of the British Museum, and founder of the well-known firm of taxidermists in College Place, Camden Town. Mr. Gerrard, who was born on October 20, 1810, joined the British Museum as special attendant to Dr. J. E. Gray in 1841, and for many years had charge of the osteological collections. He was the author of the "Catalogue of the Bones of Mammalia in the British Museum," published in 1862. After fifty years' service in the museum Mr. Gerrard retired in 1896.

LORD CREWE, Secretary of State for the Colonies, has appointed a committee, formed of representatives of the Colonial Office and of the Natural History Branch of the British Museum, to consider the protection of plumage-birds. The main object in view is to consider to what extent it may be practicable to prevent, either by legislation or by departmental control, the indiscriminate slaughter of such birds now prevalent in certain parts of the Empire. Action of this nature can be effectual only by the cooperation of the Governments of all the countries included in the British Empire, and it is hoped that this may be obtained. The names of the committee will be published in due course. A provisional meeting of the members has been held already.

THE ninety-third annual meeting of the Swiss Society of Natural Sciences is to be held this year at Bâle on September 4–7. During the meeting lectures will be delivered by Prof. W. Ostwald, of Leipzig; Prof. E. von Drygalski, of Munich; Prof. P. Guye, of Geneva; Dr. L. Rollier, of Zürich; Prof. A. Ernst, of Zürich; Dr. Paul Sarasin, of Bâle; and Dr. H. G. Stehlin, of Bâle. The Swiss Societies of Botany, Chemistry, Geology, Physics, Zoology, and Mathematics will meet at Bâle at the same time. The secretary for the meeting is Dr. H. G. Stehlin, Museum of Natural History, Augustinergasse, Bâle, from whom all information may be obtained.

ON Monday last, June 20, at the invitation of the Lord Mayor of Birmingham, a meeting of the most prominent naturalists of the city was held in the Council House to consider the establishment of a Natural History Museum. The Lord Mayor, in opening the meeting, stated that the City Council is willing to allot considerable space for a natural history museum, but cannot undertake to provide the collections. Sir Oliver Lodge moved "that this meeting heartily approves of the establishment of a natural history museum worthy of the city." In the course of an interesting speech he remarked that the study of natural history is of special value to town citizens, and it has become more difficult to carry on the study save by such means as the meeting had assembled to promote. Birmingham is a great city, and can well afford a natural history as well as an art museum. Sir George H. Kenrick seconded the motion. He emphasised the responsibility that rests on individual effort to make the museum a success. He laid particular stress on the value of a library attached to the museum, and well stocked with books dealing with the subjects illustrated only perhaps partially in the galleries. Alderman Beale, chairman of the Art Gallery Committee, and other speakers, including Prof. Carlier, strongly advocated the formation of a museum. If the City Council carries out its intention of allotting the space, there will apparently be no difficulty in filling it, to the great advantage of all branches of the community. An influential committee was formed, and the motion was carried unanimously.

THE council of the Association des Ingénieurs électriciens sortis de l'Institut électrotechnique Montefiore, Liége, has issued the conditions which will govern the triennial award of the prize—the "Fondation George Montefiore"—which is to be awarded for the first time in 1911. The prize will be the accumulated interest on 150,000 francs in Belgian three per cent. funds, and is to be given for the best original work in French or English on the scientific advance and the progress in the technical applications of electricity. The last date for the reception of works to be submitted to the committee of award is March 31, 1911. Competitors should address M. le Secrétaire-archiviste de la Fondation George Montefiore, à l'Hôtel de l'Association, rue St. Gilles, 31, Liége.

THE annual report, dated May 13, of the Society for the Astronomical Study of Ancient Stone Monuments, Cornwall Branch, shows increasing interest in the work undertaken. The "most important excursion the society has ever had" was made on July 16, 1909, to the Wendron Circles. The leading object kept in mind is to follow up some preliminary observations of monuments with a more detailed examination, with the sure result of discovering features which at the first visit escaped attention. A striking feature of the kind is reported from Tregaseal and Wendron. The summer meeting this year was held at Boskednan Circle, Madron, on June 17. The treasurer's report shows an increasing balance in hand. The president is the Right Hon. Viscount Falmouth, and the honorary secretaries Mr. Henry Thomas and Mr. H. Bolitho.

A CORRESPONDENT, after hiving a swarm, noticed certain bees standing on the ledge before the entrance, rapidly moving their wings. It may be observed that when many

bees behave in this way they act as a lure to those outside the hive, and that each bee elevates the tip of her abdomen, and exposes a membrane there, situated between the fifth and the sixth dorsal segments. This membrane gives off a pungent scent, which the waving of the wings disseminates; no doubt the scent attracts bees that have lost their way to the entrance. A bee that has had a difficulty in finding the entrance, before she passes into the hive, stands for a short while on the alighting board to fan and expose her scent membrane. Thus, when many bees are uncertain about the position of the entrance, they are attracted there by the scent. A description of this scent-producing organ of the worker honey-bee, and the vibration of the wings to which our correspondent refers, will be found in Mr. F. W. L. Sladen's "Queen-Rearing in England," published at the office of the *British Bee Journal*, 23 Bedford Street, Strand, W.C.

A NATIONAL committee (of which the King, when Prince of Wales, acted as honorary chairman), representative of the colonies, of the Navy, of the shipping industry, and of the learned societies, has been formed under the auspices of the British Empire League to secure the erection in London of a memorial to Captain Cook. It is a reproach to the nation that no recognition should have been paid to the memory of a man whose intrepid explorations resulted in such notable additions to the British Dominions, and whose scientific work has been of the greatest value to mankind. For the purpose a fund of at least 3000*l.* will be needed, to which the committee now invites contributions. Nearly one-third of this amount has been subscribed by members of the committee. Cheques should be crossed Robarts, Lubbock and Co., and made payable to the treasurer, Lord Brassey, G.C.B., 24 Park Lane, London, W.

THE interesting speeches made on the occasion of the presentation of a marble bust of the late Dr. John Hopkinson, F.R.S., to the Institution of Electrical Engineers on November 11, 1909, are printed in the journal of the institution (vol. xliv.). In making the presentation on behalf of his mother, Prof. B. Hopkinson did not claim too much when he said that "so long as dynamos are made, so long will the designers of such machinery, and the inventors of new forms of it, have first to master and then to use the fundamental principles which my father laid down." Mr. W. M. Mordey, president of the institution, in expressing the thanks of the council and members to Mrs. Hopkinson for the gift, pointed out some of the landmarks laid down by Dr. Hopkinson in connection with the development of electrical engineering. Dr. Hopkinson not only raised the knowledge of the dynamo from chaos into engineering and scientific order, but also made valuable contributions to subjects of purely physical interest. He was distinguished as an investigator, inventor, and teacher, and the marble bust at the Institution of Electrical Engineers will remind all who see it of a life to be emulated as well as honoured.

THE third annual exhibition of the Society of Colour Photographers is now open at 24 Wellington Street, Strand, and will close on July 9. There is manifest a general levelling up in quality, and many, such as Mr. Hollyer's three-colour collotypes and Mr. Clifton's three-colour carbon prints, show what skilful manipulation can do with methods that allow much scope for error. Among the transparencies by the autochrome and similar processes are several examples on the new "Dufay" plates. The Thames Plate Company is bold enough to show four duplicates made from the same negative, and though any one alone might perhaps be accepted as satisfactory, the slight differences between the colours in the four prints demonstrate in an interesting way the difficulty of making two colour photographs exactly alike. Messrs. Mees and Pledge show an interesting series of photomicrographs of eight different kinds of three-colour screens, with various spectra and resolving power tests of colour plates. Dr. Mees also shows one of Mr. Ives's new colorimeters. The exhibition presents in a small space an excellent summary of the present condition and possibilities of colour photography from a practical point of view, together with many analytical results of especial interest to the scientific student.

THE seventy-eighth annual meeting of the British Medical Association is to be held in London on July 22–29. The main business of the congress will be done in sections, which are, with their presidents, as follows:—anæsthetics, Dr. F. W. Hewitt, M.V.O.; anatomy, Prof. Arthur Keith; bacteriology, Dr. C. J. Martin, F.R.S.; dermatology, Dr. P. Abraham; diseases of children, Dr. A. E. Garrod; gynæcology and obstetrics, Dr. Mary Scharlieb; laryngology, Mr. H. Tilley; medical sociology, Dr. J. A. Macdonald; medicine, Dr. R. W. Philip; navy, army, and ambulance, Colonel A. Clark; odontology, Mr. J. H. Mummery; ophthalmology, Mr. C. Higgens; otology, Dr. E. Law; pathology, Mr. S. G. Shattock; pharmacology and therapeutics, Prof. A. R. Cushny, F.R.S.; physiology, Prof. W. H. Thompson; psychological medicine and neurology, Dr. T. B. Hyslop; radiology and medical electricity, Mr. J. M. Davidson; State medicine, Sir William Foster; surgery, Sir Victor Horsley, F.R.S.; and tropical medicine, Dr. F. M. Sandwith. The address in medicine will be delivered on July 27 by Dr. J. Mitchell Bruce, and the address in surgery on July 28 by Mr. H. G. Barling. The second annual meeting of the Medical Library Association, under the presidency of Prof. Osler, will be held on the mornings of July 27 and 28, at which papers will be read dealing with matters likely to be of practical interest and assistance to medical librarians, members of library committees, and readers. It is also intended to hold a bibliographical exhibition in connection with this meeting.

THE Horniman Museum at Forest Hill continues to advance in popularity and in the interest of its collections. In the ethnological department the most important accessions during the past year have been collections from the north-west of North America and the Eskimo region, and a series illustrating the structure of the anthropoid apes. Arrangements have also been made for a good series of illustrative lectures. In that of natural history some progress has been made in collecting a series describing the structural adaptations of animals to the chief modes of progression, and increased accommodation for vivaria and aquaria has been provided.

THE *National Geographic Magazine* for April, under the title of "The Spirit of the West," continues the graphic and well-illustrated series of articles by Mr. C. J. Blanchard, of the United States Reclamation Department, on the extensive works completed and in progress for extending irrigation in the Mississippi Valley. Thirteen million acres now produce harvests valued at 50,000,000*l.*, and support more than 300,000 families at present, with hopes of large increase in the immediate future. One of the most important of these works is the gigantic concrete dam, said to be the highest in the world, which bars the canon of the Shoshone River collecting the drainage from the lofty mountains east of Yellowstone Park. This rises to a height of 328 feet, slightly higher than the summit of the dome of the Capitol at Washington.

IN the second issue for the present year of the *Bulletins et Memoires* of the Société d'Anthropologie of Paris, Dr. A. F. Legendre publishes an elaborate anthropometrical study of that strange race, the Lolos of the Kien Tch'ang Valley, who have hitherto been a puzzle to ethnologists. In spite of the domination of the Chinese, who have taught them many vices, such as alcoholic drinking, they preserve some measure of independence, and in consequence of the ill-treatment to which they are accustomed they are so suspicious of strangers that there is much difficulty in investigating their ethnical characteristics. They seem to have decided affinity with the Tibetan stock, but they combine certain negroid characters with a curious fairness of skin. Dr. Legendre does not venture to give a decided opinion on their origin, but the elaborate measurements which he supplies will greatly assist in the solution of the problem.

IN reference to the confirmation of the existence of pygmies in New Guinea, referred to in NATURE (p. 433), it should have been noted that Dr. A. B. Meyer in 1908 wrote ("Die Papuasprache in Niederländisch-Neuguinea," *Globus*, Bd. xciv., p. 192):—"The question whether the Papuans are a uniform race with a great breadth of variation or a mixed race was pronounced by me to be not yet ripe for decision ('Negritos,' 1893, 87, and 1899, 87). Now, however, after Ray's discovery of the Papuan linguistic family, I incline to the view that they are a mixed race of 'Negritos' and Malays (in the wider sense). I am eagerly looking forward to the exploration of the interior of the great island, when here too the Negrito element may perhaps be brought to light in its old and more constant form as still existing in the Philippines, Andamans and Malakka."

IN the April number of *Biometrika* there is an article by Prof. Karl Pearson on "Darwinism, Biometry, and some Recent Biology." The article, which apparently is to be continued in the next issue, is a general criticism of recent biological work in which more or less inadequate statistical methods have been used, with unfortunate results, but the greater part is devoted to a useful discussion of some of the difficulties that arise if the theory of "pure lines" is accepted in its most stringent form—*i.e.* the hypothesis that there is absolutely no individual inheritance within the "pure line." As Prof. Pearson correctly points out, if this conception were true the correlation between offspring and parent, and that between offspring and grandparent, would be the same in any case in which the reproduction was mono-sexual. The work of Warren on Daphnia and on Hyalopterus, and that of Johannsen himself on Phaseolus, indicate that this is not the case, the grandparental coefficient being very distinctly smaller than the parental coefficient. The fact that Johannsen, Raymond Pearl, and Jennings have failed to find any sensible effect of selection within the pure line may probably be ascribed to the fact that they have all been working with characters for which the coefficient of inheritance is exceedingly low; to arrive at an appreciable result a character should be selected for which the inheritance is relatively high. In any case, of course, it remains true that for breeding purposes it will be much better to select by the method of pure lines than by selection of the characters of individuals, but the effect of selection of individuals from the mass of the population is of vital importance for the theory of evolution.

IN the June number of the *Selborne Magazine* Mr. G. S. Boulger directs attention to the enormous crop of seeds borne by many elms in England in the spring of 1909, the abundance of the crop being attributed to the fine autumn of 1908 and the sunny character of the following spring. The species which produced the seed is the smooth-leaved elm (*Ulmus glabra*), the common *U. surculosa* (or *campestris*) being infertile in this country. To the same issue Mr. J. Buckland contributes an article on the slaughter of egrets for the sake of their plumage.

MR. N. N. WORONICHIN contributes to the botanical section (parts iii. and iv., 1909) of the *Travaux de la Société des Naturalistes de St. Pétersbourg* a list, with descriptions, of Rhodophyceæ collected in the Black Sea. The number of species amounts to ninety-seven, of which Polysiphonia and Ceramium supply twelve and ten respectively; some new varieties are distinguished. Two species are cited as endemic, while a Laurencia and Ceramium are noted as being recorded from the Atlantic Ocean and North Sea, but not from the Mediterranean.

A REVISED catalogue of microscopes and accessories issued by Messrs. W. Watson and Sons, High Holborn, London, contains descriptions of the essential working parts and full particulars of their various instruments, ranging from the school pattern to the microscopist's van Heurck type; a new introduction is the inexpensive naturalist's microscope intended for general use. Great variety is offered in the shape of objectives and condensers; for low-power photomicrographic use a series of holostigmatic lenses have been designed, which are used without eye-pieces. Accessories of all kinds are listed for microscopists, bacteriologists, biologists, and for commercial purposes.

A DESCRIPTION of a singular purple-flowered Cytisus hybrid, for which an award of merit was given at the Temple Show, is communicated by Mr. R. A. Rolfe in the *Gardener's Chronicle* (June 18). The hybrid, *Cytisus* × *Dallimorei*, was raised in Kew Gardens by Mr. Dallimore from a crimson-winged variety of *Cytisus scoparius* crossed with pollen of the white broom, *Cytisus albus*. Of two seedlings obtained, only one produced purple flowers; the other bore flowers of a bright yellow. The purple colour of the seedling is traceable to the variety which is characterised by a deep crimson pigment in the wings and a slight tinge at the tip of the upper petal, the brown pigment, as the author suggests, being probably a suffusion of purple and yellow. Self-fertilised plants have been raised from both the yellow and purple hybrids, but, so far, the latter have not flowered.

THE steady progress that is being made in the application of science to agriculture in the West Indies is well shown by a comparison of the Bulletin of the Department of Agriculture, Trinidad, recently issued (No. 64, vol. ix.), with the corresponding number for last year (No. 63, 1909). The earlier issue was filled with short notes, many of which were extracted from other journals, and did not represent anything in the way of original observations; the notes might be helpful to the planters, but they were more of the nature of useful hints than of reasoned discussions of the planters' problems. The present issue is a distinct advance. It contains papers by the members of the staff on important problems connected with rubber, cacao, and cocoa-nut. Mr. Carruthers discusses the possibility of growing rubber successfully, and points out that, in spite of certain obvious similarities, there are certain fundamental differences in the conditions obtaining in Ceylon or Malaya and those in Trinidad. Chief among these is the supply of labour, which is only small in Trinidad; in consequence, the planters could not keep the plantations anything like so clean as is done in the East, nor could the tapping be done as frequently. It does not

appear, however, that the difficulties are insuperable. Mr. Carruthers also writes on the cacao canker, caused by a fungus, probably by *Spicaria colorans*, but possibly also by others; Mr. Rorer is working at the problem, and will, it is hoped, be able definitely to allocate the responsibility for the mischief. Mr. Rorer describes the witch-broom disease of cacao, Mr. Johnston writes on the cocoa-nut palm diseases, and Mr. Urich on "froghoppers" in the sugar-cane (*Tomaspis postica*, Walk.). Messrs. Carmody and Verteuil record certain analyses of local value.

IN a circular published by the U.S. Department of Agriculture (No. 118, Bureau of Entomology) Mr. F. M. Webster gives a description of a mite (*Pediculoides ventricosus*, Newport) occurring in grain which preys on the larvæ of the grain moth, adults of the barley joint-worm, &c. It also attacks man, causing an itching skin eruption.

AN excellent little "Guide to the Preservation of Health in West Africa," by Dr. Strachan, C.M.G., principal medical officer of southern Nigeria, has been published by Messrs. Constable and Co., Ltd., price 6*d*. net. It deals in simple language with anti-malarial measures, the collection and storage of water, clothing, food, &c.

THE Bulletin of the Sleeping Sickness Bureau (vol. ii., No. 17, May) contains a very complete scheme of investigation on the bionomics of the tsetse-fly, *Glossina palpalis*, which conveys sleeping sickness, and should be in the hands of all who desire to do research in this subject. So much still remains to be done that probably everyone in the endemic areas might, with the aid of a scheme like this, add his mite to our sum of knowledge.

THE *Philippine Journal of Science* for December, 1909, contains several papers of considerable medical interest and importance. Messrs. A. F. Coca and P. K. Gilman record several cases of cancer treated with a "vaccine" prepared by grinding up a portion of the tumour removed by operation. The results seem promising. Dr. Clegg, by cultivating leprosy material on agar in symbiosis with amœbæ and cholera vibrios, claims to have grown an acid-fast bacillus which he believes to be the leprosy bacillus.

PROF. MINCHIN, in his presidential address to the Quekett Microscopical Club, discusses the phenomena of parasitism among protozoa. He concludes that "in the origin of species among parasites there are, as in other organisms, two steps: first, the appearance of variations, with the resultant disharmony seen in the lethal forms; secondly, by a gradual process of reciprocal adaptation between host and parasite, the establishment of more normal harmonic relations, associated with definite specific characteristics and reactions on the part of the parasite and the host" (Journ. Quekett Microscop. Club, April).

A RECENT publication from the Ottawa Government Printing Bureau contains a report by Mr. Einar Lindeman to the Canadian Department of Mines on the iron-ore deposits of Vancouver and Texada Islands, British Columbia. Mr. Lindeman dwells on the importance of local magnetic surveys in the immediate vicinity of the outcrops of magnetite, which are a common feature in the district referred to, and gives two interesting charts based on such surveys. Unless an appreciable disturbing magnetic force exists for some distance all round an outcrop, Mr. Lindeman thinks it is pretty safe to conclude that the extent of the deposit is very limited.

IN the *Mémoires de l'Observatoire de L'Ébre*, No. 4, the Rev. J. García Mollá, S.J., describes the equipment of the electric section of the Observatory of the Ebro, founded a few years ago. The work—a French translation from the Spanish—is handsomely illustrated, and extends to more than 120 quarto pages. It describes the apparatus, including a water-dropping electrograph, an Elster and Geitel dissipation apparatus, a Gerdien instrument for air conductivity measurements, a ceraunograph, or wireless installation for recording thunderstorms, and an earth-current apparatus. Father García Mollá also discusses in a practical way a number of the difficulties encountered in working the instruments, and goes in considerable detail into the theory of the observations and their reduction. The electrical section is but one of several, and, so far at least as equipment is concerned, the observatory promises to afford remarkable facilities for the study of geophysics.

IN a paper entitled "Storms and Storm-warnings on the German Coast in the Years 1896–1905," published in *Aus dem Archiv der Deutschen Seewarte* (vol. xxxii., part ii.), Dr. L. Grossmann discusses in great detail the storm frequency for various seasons and districts, and checks the accuracy of the signals hoisted by the Deutsche Seewarte in every imaginable way. An idea of the labour entailed in the investigation may be gathered from the fact that storm statistics have been tabulated from some 10,000 monthly registers supplied by the signal stations. The distribution of storms is divided into two principal types, those which spread in a W.-E. direction and those which take place in connection with depressions over north-east Europe and spread to the westward. About 70 per cent. of the storm phenomena over the North Sea reach the Prussian coast, while only some 47 per cent. of the storm phenomena on the latter coast also occur on the coast of the North Sea. The success obtained in warning of storms from easterly directions is not very satisfactory, especially in the summer months, but the success for those from westerly directions, especially in the winter season, is very considerable. These results agree in the main with those obtained in a similar inquiry for the preceding ten years (*Aus dem Archiv*, 1898).

PROF. CARL BARUS, in a report published by the Carnegie Institution of Washington (pp. vi+83), gives an account of further experiments on "Condensation of Vapour as induced by Nuclei and Ions." The report begins with a chapter on the nuclei left behind on the evaporation of the pure water drops which are produced in moist, dust-free air when a sufficient degree of supersaturation is brought about by sudden expansion. The colour phenomena associated with clouds formed by expansion—a subject to which Prof. Barus has devoted much attention in previous researches—are dealt with in a second chapter. The principal advance here has been in the use of an approximately monochromatic source of light—the mercury green light—in the study of coronas. The rest of the report deals with the application of the corona method of estimating the number of cloud particles to the study of the ions due to radium, and the determination of the ionic charge. On the assumption that only the negative ions are caught in his experiments, he obtains for the charge carried by the ion values agreeing fairly well with those which have been arrived at by other methods. The object of the author's investigation was primarily to test the accuracy of his optical method of determining the number of nuclei. An interesting feature of the experiments is the scale on which they were carried out. Other physicists who have used the condensation method of measuring the ionic charge have worked with expansion apparatus in which the cloud chamber contained only a few c.c. of air; Barus used a fog chamber containing many litres, the number of ions

per c.c. being also large, ranging up to a million or more. The electrical quantities to be measured were thus of considerable magnitude.

PART viii. of the *Verhandlungen der deutschen physikalischen Gesellschaft* contains a paper by Dr. H. G. Möller on the calculation of the Foucault currents in iron. He considers the case of a cylinder of iron surrounded by a coil through which an alternating current is sent, and calculates the magnetic induction at any instant, taking into account the induced currents produced in the iron itself. With 100 cycles per second the B-H curves for low values of the maximum impressed H are almost identical with the ordinary magnetisation curves, but as the value of H is increased the hysteresis loop contracts near the origin. This result is in exact accord with the experiments made last year by Dr. Hausrath, and justifies the conclusion that the magnetisation in iron responds instantaneously to changes in the resultant magnetising force.

WE have received from Prof. Merczyng, of St. Petersburg, a separate copy of his paper on the indices of refraction of liquids for electric waves of small wave-length, which appeared in the April Bulletin of the Academy of Science of Cracow. The electric waves were generated by a Righi oscillator, and were measured by means of the interference produced by reflection at two metal surfaces, one a little in front of the other. The measurement gave 4·5 cm. The indices of refraction of the liquids were calculated by Fresnel's formula from observations of the relative intensities of the incident beam and the beam reflected from the surface of the liquid. They lie, for the five liquids tested, between the indices found previously by the late Prof. Drude for waves of 75 cm. and the values for light waves.

A SERIES of measurements of the temperatures of the metallic filaments of incandescent electric lamps has recently been made by Dr. M. v. Pirani at the lamp works of Messrs. Siemens and Halske, and the results are given in part vii. of the *Verhandlungen der deutschen physikalischen Gesellschaft*. The filaments were of platinum, tantalum, and tungsten, and were, in general, stranded. They were heated in an inert gas or *in vacuo* either by an external heating coil or by the current traversing them, and the temperature was measured by a standardised thermo-element of fine wire introduced between the strands. Up to a temperature of 1600° C. it was found that temperature t and current i were connected by the relation $i=a+b.t^n$, where a and b are constants and n has a value between 1·5 and 2·5. This relation was used to determine the temperature above 1600° C. Observations were also made of the "black-body temperature" of the filaments by a standardised radiation thermometer of the Holborn-Kurlbaum type using red light. Tables are given of the resistances of the filaments up to temperatures just below the melting points, and it is shown that at these points the black-body temperatures are about 150° C. below the actual temperatures.

THE quality of surface waters in the United States, by Mr. R. B. Dole, is the subject of water-supply paper No. 236, issued by the United States Geological Survey. The numerous analyses are chiefly of local interest, but the account of the methods employed is worthy of note. The highest accuracy consistent with rapidity of analysis was aimed at, and an estimate is given of the limits of accuracy achieved for each constituent. The methods of presenting the results of water analyses are also discussed, the ionic form of statement being regarded as the best, as it gives a statement of facts and not of opinion.

THE Stumpf uni-directional flow steam engine forms the subject of an illustrated article by Prof. Stumpf, of the Charlottenburg Technical High School, in *Engineering* for June 10. In this engine the steam is carried through the engine in an unchanged direction. The live steam is admitted from below into the cover, which it serves to jacket, and enters the cylinder through the valve. At the completion of the working stroke it is exhausted through slots or ports which are provided in the middle of the cylinder, and are uncovered by the piston. This avoids the losses common to ordinary engines by the cooling of the live steam ports produced by the flow of wet exhaust steam through them, and the consequent condensation in the cylinder. Prof. Stumpf claims that the remarkable advantages offered by this type of exhaust, notably the great simplicity of construction, render the uni-directional flow principle particularly valuable for engines working with superheated steam. Stationary and portable Stumpf engines of a great variety have already been built on the Continent, and their manufacture has been taken up in this country.

COMMENTING on the salving of the French submersible boat *Pluviose*, *Engineering* for June 17 states that the practice in all British submarines is to have a diving dress for each member of the crew stowed away adjacent to the station which he occupies when the boat is submerged. There is a flexible lead from the usual air service, with a valve in close proximity to each dress. In the event of an accident the dress can be put on in half a minute and supplied with air by means of the flexible lead. A purifier is fitted to the dress, which ensures a supply of air sufficient to last the man for an hour and a half. Training of the members of the crew to effect exit, in the British service, is conducted in a tank, the bottom of which is fitted up to resemble a submarine boat, and the test imposed upon the prospective members of a crew is to plunge to the bottom of the tank in an air lock, where he is required to put on the diving dress, proceed across the tank, ascend the counterfeit of a conning-tower in a submarine, and open the hatch, when he is enabled to rise to the surface. The period occupied for training the men in this important work has been found by experience to be not more than five days. Although the conditions are not quite those existing in a submarine after an accident, yet the method appears to offer the only likely solution of a very difficult problem; it is simple, and provides, at any rate, that each member of the crew will have a chance of saving his life.

WE have received from the Caxton Publishing Company, Ltd., the first volume of "Nature-study on the Blackboard," by Mr. W. P. Pycraft and Miss J. H. Kelman, to be completed in three volumes at 7*s*. 6*d*. net each. We hope to review the work when the remaining volumes are available.

A SEVENTH edition of Mr. Charles Pendlebury's "Exercises and Examination Papers in Arithmetic, Logarithms, and Mensuration" has been published by Messrs. G. Bell and Sons, Ltd. About two-thirds of the contents of the present issue consist of new matter, and the portions of the older book which have been retained appear in a somewhat different order.

THE Selborne Society has issued the third of a series of leaflets on the Brent Valley Bird Sanctuary. This deals with curious nesting places, and, like those previously issued, is profusely illustrated, having been reprinted from *The Country Home*. Copies of the leaflet may be obtained

from Mr. Wilfred Mark Webb, honorary secretary of the Selborne Society, at 42 Bloomsbury Square, W.C., post free for three halfpenny stamps.

MESSRS. SWAN SONNENSCHEIN AND CO. will publish at an early date an English translation of "Spiritism and Insanity," by Dr. Marcel Viollet. This book forms part of the Library of Experimental Psychology and Metapsychism published under the direction of Dr. Raymond Marcel, of Paris, and has been translated by Mr. Dudley Wright, editor of the *Annals of Psychical Science*.

THE report and transactions of the East Kent Scientific and Natural History Society for the year ending last September have reached us. The society is affiliated with the British Association and the South-eastern Union of Scientific Societies. The pamphlet, which has been edited by Mr. A. Lauder, the honorary secretary of the society, contains an account of the annual meeting in October, 1908, abstracts of the lectures delivered during the session, notes on the work done by the various sections of the society, and useful meteorological statistics for 1909.

MR. W. ENGELMANN, of Leipzig, has lately issued the third (enlarged) edition of Ostwald and Luther's well-known work, "Hand und Hülfsbuch zur Ausführung physiko-chemischer Messungen." The first edition was reviewed in NATURE of January 4, 1894 (vol. xlix., p. 219), and the second in the issue for December 4, 1902 (vol. lxvii., p. 101). The volume provides teachers and students with details of apparatus and practical hints on manipulation not found in any ordinary text-book, and the new edition claims a place in every chemical and physical laboratory. A second edition of Prof. M. Verworn's lectures on the mechanism of psychical life ("Die Mechanik des Geisteslebens") has been published by Mr. B. G. Teubner, Leipzig. This little work appeared in 1907, and the original edition was reviewed in NATURE of April 16, 1908 (vol. lxxvii., p. 557).

Erratum.—In NATURE of June 9 (vol. lxxxiii., p. 445), column A, line 15 from bottom, for "Thaumatocrinus" (a recent genus) read "Traumatocrinus" (a genus characteristic of Upper Trias).

OUR ASTRONOMICAL COLUMN.

JULY AND AUGUST METEORS.—With the advent of July every meteoric observer is induced to make preparation for the active campaign which the season offers. After the middle of July meteors usually become extremely abundant, and any patient watcher of the skies may record a plentiful harvest of meteor-tracks. In May and June there are comparatively few shooting stars, and perhaps the average horary number is not more than four or six, but in the two succeeding months the rate of appearance often equals twenty or twenty-five per hour.

In July there is a very active display from Aquarius, which apparently reaches its maximum on July 27–31, though the meteors continue to fall from the same centre at about 339—11 during the first half of August—and in July there are many early Perseids displayed, though the latter are a different class of meteor to the Aquarids. Those which are directed from Perseus are of the swift, streaking order, while those from Aquarius are of the slow, trained variety, and they have long flights, the radiant being in low altitude.

This year both the Aquarids and Perseids may be observed to advantage, as the moon will offer little interference. On August 12, when we are led to expect the greatest abundance of meteors, our satellite will set at 10.9 p.m. and leave us with a dark sky, on which the meteors may be seen at their best; but, of course, in our English climate atmospheric conditions are always very doubtful. What we require is a series of beautifully transparent skies such as we experienced during the first half of August, 1909. Observers should seize such opportunities as are available and determine the place of the radiant and horary rate of meteoric apparitions on every clear night. The individual paths of those meteors equal to or brighter than first magnitude should be carefully recorded. The last few years have furnished average displays of Perseids; there is some reason to expect a richer shower this year.

THE LACINGS BETWEEN JUPITER'S BELTS.—Circular No. 124 from the Kiel Centralstelle contains a telegram from Prof. Lowell, dated June 14, announcing that the "criss-cross filaments interlace all Jupiter's belts." This refers to the lacings first observed between the equatorial belts by Mr. Scriven Bolton, and apparently means that similar lacings have been observed between *all* the belts.

OBSERVATIONS OF ORIONIDS IN 1909.—To No. 4418 of the *Astronomische Nachrichten* Prof. Dubiago communicates the results of the Orionid observations made at the Engelhardt and Kasan Observatories during October 17–20, inclusive, 1909. The times and apparent paths of ninety-six meteors were observed at the former station, and of forty-eight meteors at the latter. Eight meteors were observed at both stations, and for these real paths have been computed; the heights vary from 35 to 890 km. The following is the position of the radiant as determined from these observations:—$\alpha = 88° \pm 2{\cdot}9°$, $\delta = +21° \pm 1{\cdot}7°$.

THE CAPE OBSERVATORY.—Mr. Hough's report of the work done at the Cape Observatory during 1909 contains several items of special interest. Among other things, we learn that Dr. Halm's new spectrometer, giving direct readings of wave-lengths, was extensively employed for the measurement of stellar spectra, and the results found not to be inferior in accuracy to those secured by the older methods. It is also of interest to learn that arrangements have been made to take daily photographs of the sun to supplement those taken at Greenwich and other observatories in the Empire. A large number of stellar spectra were secured and measured in the research on the solar parallax and for the examination of the systematic motions of stars in the line of sight. For Prof. Kapteyn's "Selected Areas" programme a number of proper-motion and parallax plates were secured; satisfactory progress in the *Carte du Ciel* programme is also reported.

THE TRANSIT AND TAIL OF HALLEY'S COMET.

THE question as to whether the earth passed through the tail of Halley's comet is discussed, from the point of view of the Helwan observations, by Mr. Knox Shaw in No. 4418 of the *Astronomische Nachrichten* (p. 31). On May 18, at 13h. G.M.T., the tail was seen to stretch as far as α Equueli, where it was 2° broad, although 8° broad where it involved γ Pegasi. At 13h. on May 19 there was no sign of the tail in the west, but it was traced to θ Aquilæ, where it merged with the Milky Way. The form was still tapering, and was 15° broad at α Pegasi. Similar observations followed on May 20, when still no tail was seen in the evening; but at 14h. it was traced to the Milky Way, and was about 10° broad in Pegasus. At 6h., G.M.T., on May 21 the tail was visible for a distance of 20°, but none could be seen at dawn. The narrowness of the tail (8°) on May 18 and the increased breadth next morning suggest that it was bent back in the orbit, and probably did not begin to sweep past the earth before 12h. on May 20. At this time the earth was some four million miles south of the comet's orbit plane, and consequently the tail probably passed well to the north of the earth, for the Helwân observations, during May, suggest that it was not nearly wide enough to envelop the earth at that distance. They also show that its length was well over twenty million miles, and would therefore have enveloped the earth had the planes coincided. No sign of the comet's transit of the sun's disc was observed, although observations were made with the 4-inch Cooke equatorial. Dr. Meyermann also reports that, at Tsingtau, no trace of the comet was seen during the transit, nor were any extraordinary magnetic or meteorological effects recorded by the respective instruments.